

REMARKS/ARGUMENTS

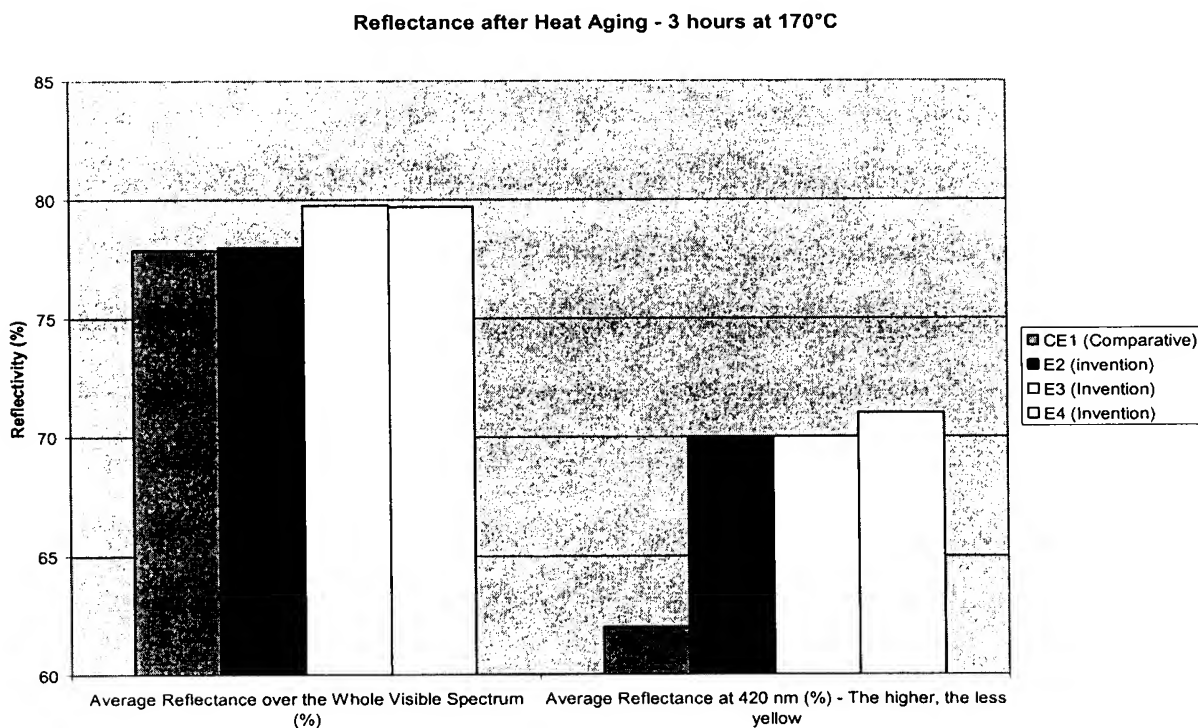
The amendment to Claim 45 is supported by Claim 73. The amendment to Claim 79 is supported by Claims 44 and 73. New Claims 87 and 88 are supported by Claims 44 and 73 and are directed to compositions comprising at least one partially aromatic polyamide (Claim 87) and at least one polyarylethersulfone (Claim 88). New Claims 89-92, 94 and 99 are supported by, e.g., Claims 62 and 64 and specification page 14, lines 13-14. New Claim 93 is supported by Claim 67. New Claims 95 and 96 are supported by Claims 75 and 77. New Claim 97 is supported by Claim 83. New Claim 98 is supported by Claim 44. New Claims 100-102 are supported by, e.g., specification page 18, lines 17-24. No new matter has been entered.

Applicants would like to thank Examiner Woodward for the helpful telephone conversation held Wednesday, October 7, 2009, during which the data presented at specification page 20 was discussed. While Examiner Woodward indicated that she had reviewed and understood the data, she indicated that any limitation of the pending claims to a black pigment content of up to 0.002 wt.% (i.e., 20 ppm) would likely present a new issue. In accordance with this indication, Applicants have now filed an RCE herewith, have limited pending Claim 44 to a narrow concentration range of black pigment of up to 20 ppm, and have presented more focused claims with regard to Applicants' method for improving the heat stability of a white-pigmented polycondensation polymer (Claim 79) and two preferred invention compositions herein: those comprising at least one partially aromatic polyamide (Claim 87) and those comprising at least one polyarylethersulfone (Claim 88).

As noted at present specification page 1, Applicants have discovered a series of polymer compositions having a substantially improved resistance to yellowing under heat aging where a combination of a white pigment is used with a very specific, limited amount of black pigment. In particular, and as now defined in the claims, the black pigment is required

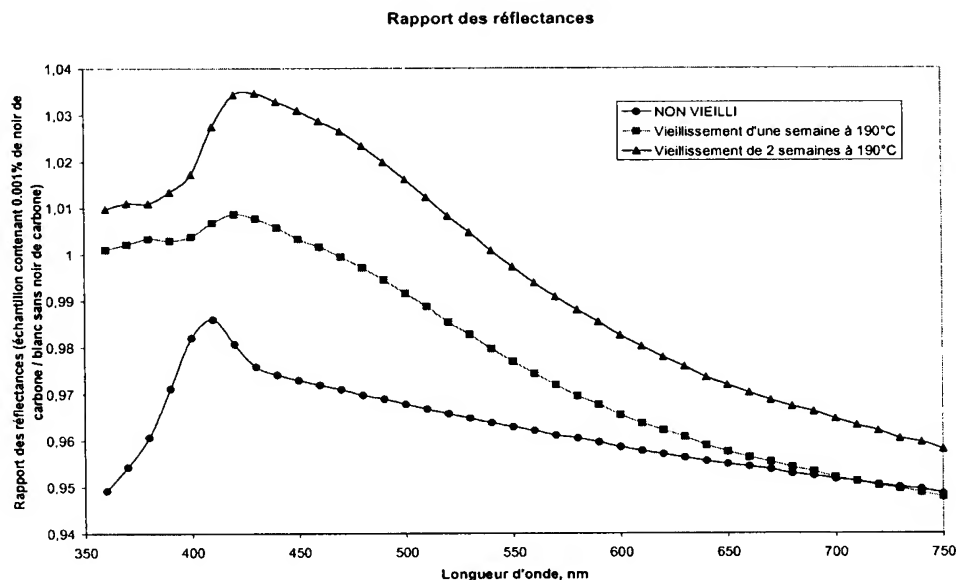
to be present, but is present in an amount of only up to 20 ppm based on the total weight of the composition.

In Example 1 herein beginning at specification page 18, polyphthalamide, a partially aromatic polyamide, was blended with white pigment and 0, 9, 12 or 16 ppm carbon black, and heat tested for yellowing. The results, presented in table form at pages 21-22 of the specification and graphed below show a substantial and surprising improvement with respect to yellowing: while the average reflectance over the whole visible spectrum remains constant or shows improvement upon the addition of the presently claimed limited amounts of black pigment, the average reflectance at those wavelength characteristic of yellowing show dramatic improvement when Applicants' combination of up to 20 ppm black pigment is used in combination with white pigment:



The graph above uses the data from Tables 4 and 5 of the specification and plots the reflectivity of CE1, the comparative example containing no black pigment, and of E2-E4, Examples according to the invention containing 9-16 ppm black pigment. While the original of this Figure is in color, that appearing above is in black and white. Nevertheless, the data is easily discernable and proceeds from left to right, with the left column or bar representing CE1 and the results for the invention compositions E2-E4 proceeding to the right. Two groups of data are shown: average reflectance over the whole visible spectrum and average reflectance at 420 nm, characteristic of yellowing. As is clear from the data in the original specification, graphed above, the present invention composition using a very small but specific amount of black pigment provides substantial and surprising anti-yellowing properties.

In addition to the data noted above, which is present in the specification as originally filed, Applicants have conducted further experiments. Applicant is currently preparing a Declaration describing a composition (E1) in accordance with the invention based on polyarylethersulfone, a white pigment, and a black pigment, namely "MPC channel black" carbon black present at 0.001 wt. % based on the total weight of the composition (i.e., 10 ppm). This composition was compared to an composition identical but for the lack of the carbon black (C1). These compositions were submitted to heat aging and the results obtained were plotted in the form of a ratio $E1/CE1$, which measures $Reflectance_{\lambda, E1} / Reflectance_{\lambda, CE1}$:



In this Figure the reflectance ratio E1/CE1, mentioned above, is plotted on the Y axis versus wavelength on the X axis for 1) non-aged samples (bottom line of data), 2) samples aged for 1 week (middle line of data) and 3) samples aged for two weeks (top line of data).¹ As aging proceeds, it is clear that the ratio at given wavelengths dramatically increases, particularly in the all-important 420 nm region, characteristic of yellowing. Because the reflectance for E1 increases relative to CE1, it is clear that the invention composition provides superior anti-yellowing behavior as compared to compositions outside the pending claims.

As is quite clear from the above, and as further explained in the forthcoming Declaration, Applicants' presently claimed invention using a white pigment and a very small, controlled amount of black pigment, is successful in providing improved resistance to yellowing which is not polymer-specific and which provides both a substantial and surprising

¹ « Rapport des réflectances » means « reflectance ratio »

« Non vieilli » means « not aged »

« Vieillissement d'une semaine à 190°C » means « Aging for one week at 190°C »

« Vieillissement de 2 semaines à 190°C » means « Aging for 2 weeks at 190°C »

« Rapport des réflectances (échantillon contenant 0.001% de noir de carbone / blanc sans noir de carbone) » means « Ratio of the reflectances of the sample containing 0.001% carbon black to the white reference sample without carbon black »

« Longueur d'onde, nm » means « Wavelength, nm »

benefit to the art. In this regard, note that the data presented in the specification was obtained with a semi-crystalline polymer, while that described immediately above was obtained with an amorphous polymer, each having different heat deflection temperatures. Note further that the polycondensation polymers used in Applicants' examples are essentially unrelated in their basic repeating units, yet Applicants' combination of white pigment and specified amount of black pigment (20 ppm or less) provided surprising and unexpected anti-yellowing properties in all compositions representative of the invention.

Ohtomo, cited against the claims, is certainly relevant in that it concerns a thermoplastic resin composition where yellowing due to light is suppressed. However, the composition described in Ohtomo is very limited with regard to morphology: it requires as a necessary condition that the PPE phase described be dispersed as a particulate in the PA phase, and that the pigment be dispersed in the PPE phase. It is this specific morphology which improves resistance to light yellowing in Ohtomo. See column 2, lines 9-18 of the reference, reproduced below for the Examiner's convenience:

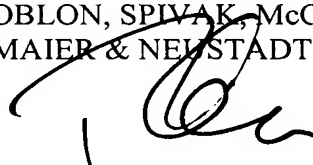
First, in the resin composition of the present invention, it is necessary that a condition be achieved whereby the PPE phase is dispersed as a particulate in the PA phase which is the continuous phase, and in addition, whereby the styrene thermoplastic resin, rubber polymer and pigment are in a dispersed condition (morphology) in the PPE phase. By means of such a morphology, a resin is obtained which has improved resistance to light yellowing while maintaining the superior characteristics of PPE/PA resins (particularly, heat resistance and impact resistance).

Thus, and quite certainly, Ohtomo requires both a polyphenylene ether resin and a polyamide resin dispersed in a particular morphology relative to one another, and the presence of certain components, including the pigment, only in the polyphenylene ether phase (compare with Claims 100-102 herein). Moreover, and using only the specific morphology described, Ohtomo discloses the use of substantially more carbon black as compared with the presently claimed limited amount of 20 ppm. See Table I of the reference at column 11 where pigment (c) represents carbon black (note column 9, lines 59-60 of the reference). Here, the lowest amount of carbon black used is 0.05 wt.%, which translates to 500 ppm carbon black. In sharp contrast, the present invention is limited to 20 ppm and below.

Accordingly, and in view of the differences between what is disclosed in Ohtomo and claimed herein, Applicants respectfully submit that the pending claims are free of rejection as they are not obvious over the disclosure in Ohtomo. Thus, the reconsideration and withdrawal of the outstanding obviousness rejection is requested, as is the passage of this case to Issue.

Respectfully submitted,

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